MID TERM REVIEW

INCREASED GRANTS & ALTERED SPECIFICATIONS

>> SEE PAGE 44

SUPPORT SCHEME FOR RENEWABLE HEAT

EXPECT TO FINALISE APPLICATIONS IN 2018

>> SEE PAGE 66

ROUNDWOOD MEASUREMENT

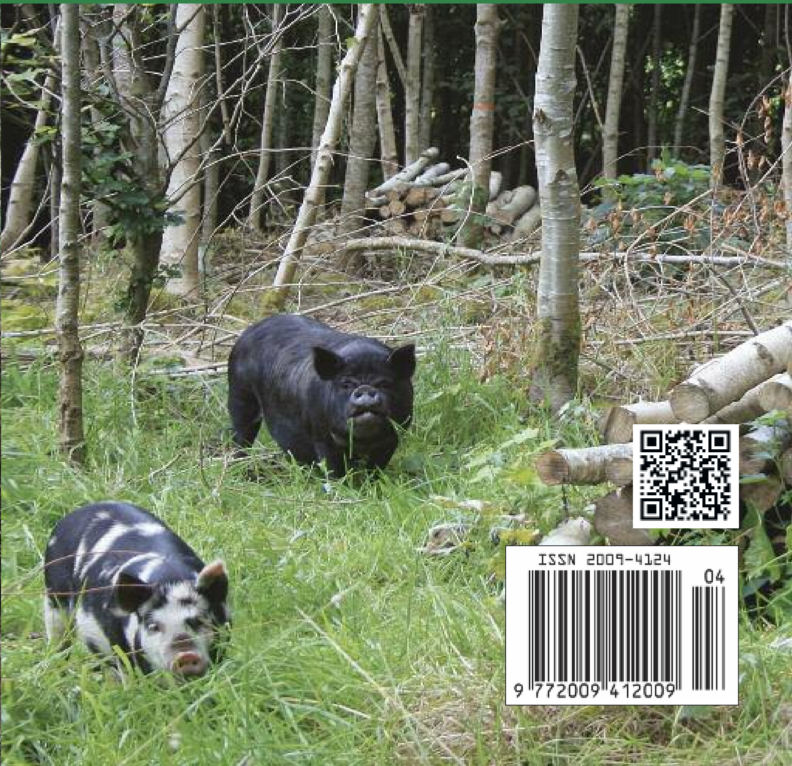
ARE APPS BETTER THAN TIMBER MEASUREMENT MANUAL?

>> SEE PAGE 18

Forestry & Energy REVIEW

Volume 8 Issue 1 Spring/Summer 2018
Price €3.95. £2.95 (Stg)

THE VOICE OF FORESTRY & RENEWABLE ENERGY



ISSN 2009-4124
04
9 772009 412009

Forestry & Energy REVIEW
Volume 8 Issue 1
Spring/Summer 2018

Foreword

Welcome to the Spring/Summer Edition of Forestry & Energy Review Magazine.

In this issue, we welcome the completion of the Mid Term Review and the alterations to the program that are aimed at addressing some of the shortcomings in the program at present. It aims to increase the percentage of broadleaf planted along with greater diversity of conifers. It also announces a pilot scheme for Knowledge Transfer Groups which have been effective in the dairy sector at widening and improving the knowledge base of farmers.

Tom Kent and his colleagues at WIT have done an evaluation of the roundwood measurement app "Timbeter". It appears that while there are weaknesses in the system the developers are well on the way to providing a worthwhile measurement tool.

Niall Farrelly of Teagasc explains that good thinning practice adopted at first and second thinning should put more money in your pocket through the lifecycle of the forest's life. This is based on research rather than anecdotal evidence.

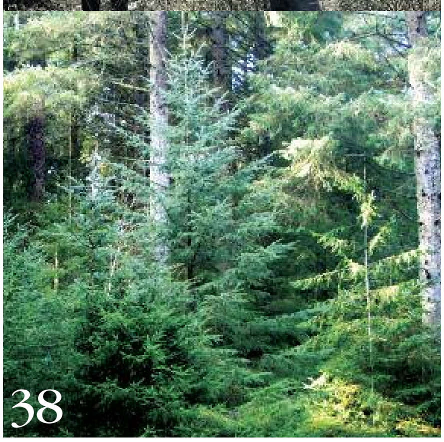
Ted Wilson and his colleagues have outlined the benefits of Continuous Cover Forestry which also features in the Mid Term Review. In contrast with other areas Europe, Ireland and the UK fall behind in this category of forestry. This type of forestry is believed to be more resilient in this era of climate change so may be worth considering where appropriate.

Forestry as a career can be varied and challenging and needs to be encouraged more widely. The uptake on college courses needs to be increased and it behoves us all work in that direction…

APF is round the corner if you haven't planned your trip or booked your stand.

Until the next time.........

The Publisher
Forestry & Energy Review



Features

The Publisher:
Denis Lane

Enquiries:
Editorial: Denis Lane
Tel. + 353 91 777222
Email: dlane@selectmedialtd.com
Advertising: James Small
Design: John Barrett
Production: Emma Meade

Contributors:
Karl Coggins (Forest Service, Department of Agriculture, Food and the Marine), Tom Kent, Kevin Fitzsimons & Adrian Redmond (Waterford Institute of Technology), Marie Doyle (UCD Forestry), Dr. Niall Farrelly (Teagasc), Noel Kennedy (Teagasc), Edward Wilson (Teagasc Forestry, UCD Forestry), Ian Short (Teagasc Forestry), Áine Ní Dhubháin (UCD Forestry), Paddy Purser (Purser Tarleton Russell Ltd) Brian Clifford (DAFM), Ian Millward (APF International Forest Machinery Exhibition), Joe Murphy.

Distribution:
EM News
Newspread

Published by: Select Media Ltd,
4-5 Burton Hall Road
Sandyford, Dublin 18
Tel. + 353 1 6622266
Email. info@selectmedialtd.com

TRANSFORMING SITKA SPRUCE PLANTATIONS TO CONTINUOUS COVER FORESTRY

Identifying potential crop trees and regular thinning are the keys to successful transformation of plantations to resilient, continuous cover forests. By Edward Wilson, Ian Short, Áine Ní Dhubháin and Paddy Purser.

Photo: Gareth Browning/Forestry Commission 2018

Figure 1. Continuous cover forestry in a mature stand of Sitka spruce at Whinlatter Forest, Cumbria, England. The stand was planted in 1920 and is located at 313 m altitude; it has a Yield Class of 16. This stand has good stability, high quality trees across a range of sizes and significant natural regeneration.

UCD AND TEAGASC FORESTRY RESEARCH

Introduction

Forestry is entering a new phase where traditional management objectives must be balanced with the need to enhance ecological resilience. Predicted changes in our climate plus the very real threats from introduced insect pests and diseases are making us look again at the composition and structure of our forests. Currently in Ireland and the UK we rely on a small number of productive conifer and broadleaved species, and clear-felling remains the dominant silvicultural system. Using a wider range of genotypes, species and silvicultural systems will lead to a more diverse resource and reduce environmental risks. However, the challenge for foresters is to develop and adopt new approaches that increase resilience while also sustaining timber production and other forest values.

Continuous Cover Forestry, commonly referred to simply as CCF, is one of the most important options to emerge in recent years. CCF is a flexible and adaptable management system that creates diverse and resilient forest stands. In this article, we provide a brief overview and consider current research on CCF, especially in production forests dominated by Sitka spruce.

DEFINITION OF CCF

Continuous cover forestry is defined as the use of silvicultural systems where the forest canopy is maintained at one or more levels without clear-felling. The guiding principles are to manage and sustain the forest ecosystem, work within site limitations and use natural processes wherever possible. Through single tree and small group selection, production and regeneration take place simultaneously. Gradually, as a result of successive interventions, the stand develops an irregular structure (Figure 1).

There are several economic and environmental attributes of CCF that may contribute to its wider adoption in Ireland and the UK. In economic terms, CCF enables the forester to select individual trees on the basis of their potential for high quality timber production. Through good thinning practice, it is possible to control the growth increment of high quality trees and schedule their harvest across stand interventions to the point where they achieve their target size or optimum value. Environmentally, several advantages of CCF forests have been identified relative to even-aged systems, that contribute to forest resilience: they can be more windfirm; they maintain a more even carbon storage; they show lower soil carbon losses during harvesting; there is a reduced risk of soil fertility loss; they maintain higher humidity levels and they are well-suited to both single and mixed species management. In catchments and riparian zones, CCF can be used to regulate water yield, stream temperatures and reduce the risk of siltation or nitrate flushes that are often a concern downstream from clear-fell sites. CCF is also desirable in multi-functional forests where landscape, recreation and conservation values are important. In effect, stands acquire old growth characteristics that enhance biodiversity.

TRANSFORMATION OF PLANTATIONS

In Ireland and the UK, most forest stands are plantations composed of a single, or a very limited number of species. In order to increase the area of woodland managed as CCF, it is necessary to identify suitable even-aged stands that can be transformed from a uniform to irregular structure. Transformation is achieved as a planned and progressive series of stand interventions that emulate the successional stages in natural woodland. The principles of CCF transformation are well defined and the practice of CCF is now the standard approach to forest management in many parts of Europe.

There are four well-defined stages, summarised as follows:

Stage 1: Preparation

Stands should be identified early in their development based on their suitability for thinning and productivity. Poor quality trees (inferior phenotypes) should be removed and better quality trees (superior phenotypes) should be retained. Individual tree stability can be increased through the thinning process (i.e., modifying height: diameter ratios) and the selection process can then continue with frequent light thinnings. Identifying good quality stems, across a range of diameter classes, will by default lead to greater irregularity in the canopy strata. This is best achieved with "crown" thinning as opposed to "low" thinning, which is the norm in most even-aged plantations. This approach allows the forest manager to concentrate stand increment on high quality stems (Figure 2).

Stage 2: Regeneration

As the stand matures and trees start to produce seed, consideration can then include the regeneration process. Thinning should aim to reduce basal area and enable appropriate levels of light to reach the forest floor. Threshold basal areas for regeneration, and separately for sustained growth, are now well recognised for most of our productive species, and this information can act as a guide for thinning prescriptions. Avoiding uniform removal of the overstorey trees, and maintaining a degree of "clumping", will allow natural regeneration to become established in small cohorts at irregular spacings throughout the stand.

Stage 3: Structural development

In this stage, tree selection focuses on removing high quality (crop) trees at their desired target size, and maintaining good quality smaller trees (i.e., future crop trees) from across a broad range of diameter classes. Ideally, a maximum of 20% of basal area and a volume no greater than the stand increment will be removed at an intervention.

Stage 4: Structural maintenance

Finally, the stand will be transformed to an irregular structure where the objective is to maintain a sustained yield of high value trees while promoting the development of the understorey strata. Trees should be marked for removal at their optimum economic value, often called the target size, or if they are damaged and not contributing to the development of the stand structure. Wind damage, if it occurs, becomes part of the management system and generally understorey trees are released to fill the gaps created by blowdown of larger individuals.

CCF IN PRACTICE

In contrast with other areas in Europe, a relatively small area in Ireland and Britain is currently managed on CCF principles. Research by Lucie Vítková and colleagues, published in Irish Forestry (2013), identified approximately 10,600 ha where CCF is being practiced in Ireland. Experience with CCF is most advanced in broadleaved woodlands and conifer species, such as Douglas fir, commonly found on sheltered sites with favourable conditions for natural regeneration (and where browsing animals are controlled). Nonetheless, a survey of forestry professionals in Ireland found there was significant interest in the wider use of CCF but that a lack of experience, training and reliable measures of stand performance were barriers to further progress. To promote greater understanding of CCF, the Irregular Silviculture Network (ISN) has established long-term research stands that provide information on stand development, individual tree performance, costs and revenues, and wider ecosystem services. Currently there are 6 sites in Ireland, each enumerated on a 5-year cycle.

A critical element of CCF is the selection and marking of trees to remove and retain at each stand intervention. A detailed understanding of tree development and quality criteria is required. Linked to this is a need for regular, simple inventories of stand structure. Information about diameter distribution, stem quality classes, growth increment and basal area is necessary to prepare tree marking prescriptions and monitor overall stand performance.

Figure 2. Sitka spruce in transformation to CCF at Bryn Arau Duon Forest, Wales. This large upland forest is at an altitude of 400m. The stand in this image was established in 1962 and has a Yield Class of 16. It has been thinned 3 times on a 4 year cycle. The focus at each intervention is to concentrate the increment on high quality trees. Natural regeneration is beginning to be established in many stands across the forest. Also note that there is a well-developed infrastructure that supports access to the stands.

Photo: Phil Morgan 2017

Photo:Anders Lundholm 2017

Figure 3. The TranSSFor thinning experiment, Co Laois. This study is comparing stand development under "low", "crown" and "graduated density" thinning regimes. The stand was established in 1992 and thinned in 2011 and 2014. The third thinning is scheduled for spring 2018.

CCF AND SITKA SPRUCE

Sitka spruce is the mainstay of the forest products sectors in Ireland. In total, 335,000 hectares of Sitka spruce have been planted. The vast majority of this resource is managed in plantations less than 40 years in age. Transformation of even a small proportion of Sitka spruce plantations to CCF would significantly increase overall forest structural diversity and resilience.

Currently, there is limited guidance available for transformation of Sitka spruce stands to CCF in Ireland. The closest large-scale examples in upland locations are in Wales, such as Clocaenog Forest, which is managed by Natural Resources Wales. Here a variety of selection and shelterwood systems is being trialled on sites at relatively high elevations. In the private sector, forestry consultants Phil Morgan and Huw Denman have been working on techniques in several woodlands (Figure 2).

Some of the considerations for transformation in Sitka spruce plantations are now becoming more apparent. An early start to the transformation process is especially important on upland sites and where soils are relatively shallow to promote stand stability. Maintaining good drainage across the site is also important to avoid an adverse rise in the water-table. Extra care may be necessary in opening the canopy after thinning operations; too much side light will stimulate epicormic shoot development that can reduce sawlog quality.

CURRENT RESEARCH: THE TRANSSFOR PROJECT

There is much still to learn about CCF in upland Sitka spruce plantations in Ireland. The COFORD-funded Low Impact Silvicultural Systems project (LISS), led by University College Dublin and completed in 2014, began the process of filling knowledge gaps. As part of this study, a long-term thinning experiment was established in two Sitka spruce stands on contrasting soil and site types in Ireland (Figure 3). The first site is located in Co Laois on a mineral gley soil, at an elevation of 300 m, in a forest managed by Coillte. The second site is in Co Wicklow on a brown earth soil at a slightly lower elevation, in privately-owned woodland. The experiment was designed with three thinning treatments: low, crown and graduated density thinning. The first two thinning interventions took place in 2011 and 2014. Initial work on this study was led by Dr Lucie Vítková as part of her PhD project.

In 2017, funding was secured by Teagasc for a Walsh Fellowship (2017-2021) that enables the study to continue on through the third thinning operation, and to generate the first research papers and operational guidance. This project is titled "Transformation of Sitka spruce stands to continuous cover forestry", more simply, the TranSSFor project. The research is being supervised by Drs Ian Short (Teagasc) and Áine Ní Dhubháin (UCD Forestry). Thinning operations are scheduled for the first half of 2018 and 2019. Data will be collected on stand productivity, structural development, tree stem quality and environmental conditions within each treatment unit.

In addition to research on tree and stand development, it is anticipated there will be professional development and knowledge sharing events for foresters, contractors and woodland owners. Site visits and training workshops on tree marking for CCF are already being planned.

FURTHER INFORMATION:

Ted Wilson, Walsh Fellow in Silviculture, Teagasc and UCD.
Email: ted.wilson@teagasc.ie

FURTHER READING:

• Sanchez, C. 2017, Pro Silva silviculture: guidelines on continuous cover forestry/close to nature forestry management practices. Circular 2718. Forêt Wallonne, Namur, Belgium. 64 pp.
• Susse, R., et al. 2011. Management of irregular forests: developing the full potential of the forest. Association Futaie Irrégulière, Besançon, France. 144 pp.

WEBSITES:

- Teagasc, TranSSFor project: www.teagasc.ie/crops/forestry/research/transformation-of-sitka-spruce-to-ccf/
- Pro Silva Ireland (PSI): www.prosilvaireland.wordpress.com
- Continuous Cover Forestry Group (CCFG): www.ccfg.org.uk

This article was written by Edward Wilson (Teagasc Forestry Development Department and UCD Forestry), Ian Short (Teagasc Forestry Development Department, Ashtown, Dublin 15), Áine Ní Dhubháin (UCD Forestry, University College Dublin, Belfield, Dublin 4) and Paddy Purser (Purser Tarleton Russell Ltd, Forest Sector Management, Consultancy & Research, Woodenbridge, Co. Wicklow).
Thanks to Phil Morgan (SelectFor Ltd) for helpful comments on a draft of this article.